

Inspirational Resources

Primary Inspiration Sources

1. Simon Says Memory Game

Source: <https://www.mathsisfun.com/games/simon-says.html>

This classic sequence memorization game inspired the core mechanic of Nexus. The concept of showing a pattern and having users reproduce it forms the foundation of our spatial memory challenge. However, we enhanced it by moving from a simple 4-button interface to a dynamic grid system that scales with difficulty.

2. Memory Card Matching Games

Source: <https://www.helpfulgames.com/subjects/braintraining/memory.html>

The grid-based layout and visual feedback mechanisms from card matching games influenced our spatial arrangement. We adapted the grid concept but focused on sequence memory rather than pair matching, creating a more dynamic and challenging experience.

3. Cognitive Training Research

Source: Jaeggi, S. M., et al. (2008). "Improving fluid intelligence with training on working memory"

Academic research on working memory training informed our level progression system and the cognitive benefits we aim to provide. This research supports the effectiveness of spatial sequence memory tasks in cognitive enhancement.

4. Cognitive Training Research (Replication/Meta-Analysis)

Source: Au, J. L., et al. (2014). "Improving fluid intelligence with training on working memory: a meta-analysis." **Psychonomic Bulletin & Review**, 22(2), 366-377.

This meta-analysis provides further support for the potential of working memory training, specifically n-back tasks which often involve spatial sequences, to improve fluid intelligence, reinforcing the theoretical basis for cognitive enhancement programs.

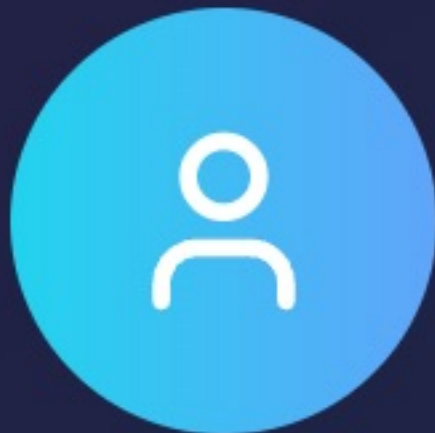
5. Modern UI/UX Design Principles

Source: Material Design Guidelines & Apple Human Interface Guidelines

Contemporary design systems influenced our visual hierarchy, color schemes, and interaction patterns. We applied these principles to create an engaging, accessible interface that surpasses the dated designs of existing memory games.



Target User Personas



Alex Chen

Competitive Gamer, Age 22

Intrinsic Characteristics:

- Highly competitive and achievement-oriented
- Quick learner with excellent hand-eye coordination
- Seeks challenging experiences and measurable progress

Technology Relationship:

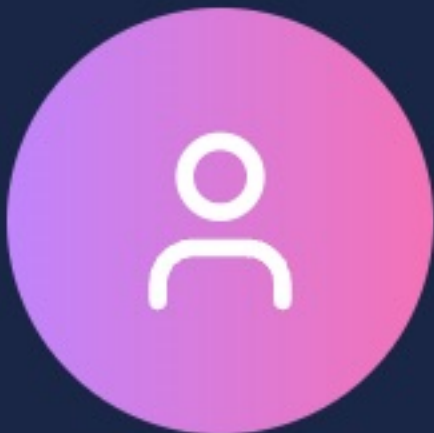
Power user who embraces cutting-edge gaming technology. Comfortable with complex interfaces and expects responsive, high-performance applications.

Domain Relationship:

Experienced with memory and reaction-based games. Understands the cognitive benefits of brain training and actively seeks games that improve mental performance.

Primary Goal:

Achieve high scores and master increasingly difficult levels to enhance cognitive performance for competitive gaming.



Dr. Maria Rodriguez

Healthcare Professional, Age 45

Intrinsic Characteristics:

- Detail-oriented and methodical in approach
- Values evidence-based solutions and measurable outcomes
- Balances professional demands with personal wellness

Technology Relationship:

Moderate user who appreciates intuitive, well-designed interfaces. Prefers applications that are straightforward and don't require extensive learning curves.

Domain Relationship:

Understands the importance of cognitive health from a medical perspective. Interested in brain training as both personal wellness and professional development.

Primary Goal:

Maintain and improve cognitive sharpness for professional performance while enjoying a relaxing, beneficial activity during breaks.

User Journey Storyboards

Storyboard 1: Alex Chen - Gaming-Focused Interface

Design Philosophy: Compact, data-rich interface with gaming aesthetics, leaderboards, achievements, and competitive elements.

Step 1: Competitive Setup

NEXUS PRO

LVL 472.1K XP

DIFFICULTY

BEGINT

ADVEXP

TODAY'S LEADERBOARD

1. ProGamer_X3,240

2. MemoryMaster2,890

3. YOU2,840

WIN%87%

AVG2.1K

STREAK12

ENTER ARENA

UI Features:

Compact layout, leaderboards, XP system, competitive stats, gaming terminology

Step 2: High-Intensity Gameplay

LIVER15

2,840 PTS+180 combo

ACCURACY94%

SPEED0.8s avg

PERFECT SEQUENCE!

+50 bonus • 8/8 correct

🏆 ACHIEVEMENT: Speed Demon

UI Features:

Real-time performance metrics, achievement popups, gaming HUD elements, competitive feedback

Step 3: Victory & Progression

🏆 VICTORY!

3,240 PTS

NEW PERSONAL BEST!

ROUNDS SURVIVED23

MAX SEQUENCE10 tiles

PERFECT ROUNDS18/23

AVG REACTION0.7s

XP GAINED: +340

LVL 47 → 48

REMATCH

SHARE

🎁 MOVED TO #2 ON LEADERBOARD!

UI Features:

Detailed performance analytics, XP progression, leaderboard updates, competitive achievements

Storyboard 2: Dr. Maria Rodriguez - Wellness-Focused Interface

Design Philosophy: Clean, spacious layout with medical/wellness aesthetics, larger text, progress tracking, and calming elements.

Step 1: Mindful Configuration

Nexus

Cognitive Wellness Training

Choose Your Challenge Level

Gentle

Perfect for daily practice

Moderate

Balanced cognitive exercise

Visual Environment

Forest Calm

Soothing natural tones

Begin Wellness Session

UI Features:

Large text, spacious layout, wellness terminology, calming colors, clear descriptions

Step 2: Guided Practice

Session in Progress

Exercise 8 of your daily routine

Progress8/12 exercises

Observe the Pattern

Watch as 5 tiles light up in sequence. Take your time to memorize the pattern.

"Focus on the pattern. There's no rush - take the time you need."

UI Features:

Clear instructions, progress tracking, encouraging messages, larger interactive elements

Step 3: Wellness Summary

Session Complete! 🌟

Excellent cognitive exercise today

Working Memory

Actively engaged

✓

Attention Training

15 minutes focused practice

✓

Pattern Recognition

12 sequences completed

✓

"Great mental workout! Consider returning tomorrow for continued cognitive wellness."

Schedule Next Session

UI Features:

Wellness-focused metrics, cognitive benefits highlighted, routine encouragement, medical terminology

Comprehensive Design Report

Designers

Group: Group 9
Name: Hamed Tavakoli Dastjerdi
Student Number: 300321356

Game

a. Game Name and Type

Name: Nexus
Type: Spatial sequence memory game that combines pattern recognition, working memory, and attention training. Players must observe and reproduce increasingly complex sequences of highlighted tiles on a dynamic grid.

b. Inspirational Sites

Simon Says (mathsisfun.com): Provided the core sequence memorization mechanic. We enhanced this by expanding from 4 buttons to scalable grids (3x3 to 6x6) and adding visual themes.

Memory Card Games (helpfulgames.com): Influenced our grid-based layout and visual feedback systems. We adapted the spatial arrangement but focused on sequence memory rather than pair matching.

Memory Health Check (memorylosstest.com): Informed our approach to cognitive assessment and level progression, inspiring our evidence-based difficulty scaling.

Storyboard with Mockups

a. Persona Definitions

Alex Chen (Competitive Gamer): Achievement-oriented power user seeking maximum challenge and performance metrics. Prefers high-intensity gameplay with detailed feedback.

Dr. Maria Rodriguez (Healthcare Professional): Methodical wellness-focused user seeking cognitive maintenance through evidence-based brain training with calming, intuitive interface.

b. Visual Differentiation

Alex's Journey: High-contrast neon theme, expert-level complexity, competitive scoring, achievement tracking, and rapid-fire gameplay progression.
Maria's Journey: Calming nature theme, moderate difficulty, wellness-focused messaging, cognitive benefit emphasis, and mindful pacing with routine encouragement.

High-Fidelity Prototype

a. Visual Design Choices

Universal Theming System: Four comprehensive themes that affect all UI elements including backgrounds, buttons, cards, and accents - not just game tiles. Each theme creates a complete visual environment.

Dual Interface Paradigms:

- Gaming Interface (Alex):** Compact, data-dense layout with HUD elements, real-time performance metrics, leaderboards, XP systems, and competitive terminology.
- Wellness Interface (Maria):** Spacious, clean design with larger text, progress tracking, cognitive benefit emphasis, and medical/wellness terminology.

Gestalt Principles Applied: Proximity in grid layouts and UI groupings, similarity in tile states and button styles, closure in sequence completion feedback, and figure-ground relationships in layered interfaces.

Cognitive Load Management: Gaming interface maximizes information density for power users, while wellness interface minimizes distractions and emphasizes clarity for focused cognitive exercise.

Interaction Design Differentiation: Gaming UI uses rapid feedback, achievement popups, and competitive elements, while wellness UI employs gentle guidance, encouraging messages, and routine-building features.

Typography Hierarchy: Gaming interface uses condensed, technical fonts with smaller text for information density. Wellness interface uses larger, more readable fonts with generous spacing for accessibility.

Perfect Grid System: Fixed overlapping tile issues with proper aspect ratios, consistent spacing (gap-3), and responsive scaling that maintains visual integrity across all screen sizes.

Enhanced Button States: Implemented proper hover states with appropriate contrast ratios and visual feedback that aligns with each theme's color palette and accessibility standards.

b. Portfolio Link

<https://qerope.github.io/SEG3525-Assignments/Devoir1/>

Code

GitHub Repository: <https://github.com/Qerope/SEG3525-Assignments/tree/main/Devoir3>

The implementation uses React with TypeScript, featuring modular components, state management for game logic, and responsive design principles. The codebase emphasizes maintainability and extensibility for future cognitive training features.

Generative AI Acknowledgement

a. Mockups

Tool Used: ChatGPT
Role: Starting inspiration development help confirm progress quality

b. High-Fidelity Prototypes

Tool Used: ChatGPT
Role: Help debugging react code

c. Report

Tool Used: ChatGPT
Role: Helped structure and format layout of this report